National **Knowledge** Network

OBJECTIVE

NKN AIMS TO BRING TOGETHER ALL THE STAKEHOLDERS FROM SCIENCE, TECHNOLOGY, HIGHER EDUCATION, HEALTHCARE, AGRICULTURE AND GOVERNANCE TO A COMMON PLATFORM.

NKN is a revolutionary step towards creating a knowledge society without boundaries. It will provide unprecedented benefits to the knowledge community and mankind at large.

National Knowledge Network (NKN) project is aimed at establishing a strong and robust internal Indian network which will be capable of providing secure and reliable connectivity. Using NKN, all vibrant institutions with vision and passion will be able to transcend space and time limitations in accessing information and knowledge and derive the associated benefits for themselves and for the society. Establishing NKN is a significant step towards ushering in a knowledge revolution in the country with connectivity to 1500+ institutions. NKN is intended to connect all the knowledge and research institutions in the country using high bandwidth / low latency network.

Globally, frontier research and innovation are shifting towards multidisciplinary and collaborative paradigm and require substantial communication and computational power. In India, NKN with its multi-gigabit capability aims to connect all universities, research institutions, libraries, laboratories, healthcare and agricultural institutions across the country to address such paradigm shift. The leading mission oriented agencies in the fields of nuclear, space and defence research are also part of NKN. By facilitating the flow of information and knowledge, the network addresses the critical issue of access and create a new paradigm of collaboration to enrich the research efforts in the country. The network design is based on a proactive approach that takes into account the future requirements and new possibilities that this infrastructure may unfold, both in terms of usage and perceived benefits. This will bring about a knowledge revolution that will be instrumental in transforming society and promoting inclusive growth.

KEY HIGHLIGHTS

THE ARCHITECTURE OF NKN HAS BEEN DESIGNED FOR SCALABILITY AND THE NETWORK CONSISTS OF AN ULTRA HIGH SPEED CORE INHERENTLY CAPABLE OF PROGRESSIVELY MOVING WITH MULTIPLES OF10/40/100 Gbps, COMPLIMENTED WITH A DISTRIBUTION LAYER ATAPPROPRIATE SPEEDS.

The purpose of such a knowledge network goes to the very core of the country's quest for building quality institutions with requisite research facilities and create a pool of highly trained professionals

The idea of setting up the NKN was deliberated & finalised at the office of Principal Scientific Advisor (PSA) to the Government of India (GoI) and the National Knowledge Commission (NKC) after a collaborative engagement with the key stakeholders including experts, potential users, telecom service providers, educational and research institutions. The discussions resulted in a consensus for an optimal approach to be adopted for setting up such a network, to provide a unified backbone for all the sectors.

Government of India has constituted a High Level Committee (HLC) for establishment of NKN, under the Chairmanship of the PSA to GoI. National Informatics Centre has been designated as implementing agency for NKN. The vision of NKN has been translated into an action plan by the Technical Advisory Committee (TAC) set up by the HLC.

NKN was approved in March 2010 by the Cabinet with an outlay of ₹ 5990 Crores. As a forerunner of NKN Initial phase has been successfully executed by National Informatics Centre (NIC).

The architecture of NKN has been designed for reliability, availability & scalability. The network consists of an ultra-high speed core, starting with multiple 2.5/10 G and progressively moving towards 40/100 Gigabits per Second (Gbps). The core is complimented with a distribution layer covering all districts at appropriate speeds.

The participating institutions at the edge would seamlessly connect to NKN at gigabit speed. The NKN shall be a critical information infrastructure for India to evolve as a knowledge society. NKN is a significant step which will enable scientists, researchers and students from across the country to work together for advancing human development in critical and emerging areas.

ARCHITECTURE

ENCOURAGE, ENABLE, ENRICH AND EMPOWER THE USER COMMUNITY TO TEST AND IMPLEMENT INNOVATIVE IDEAS WITHOUT ANY ACCESS CONSTRAINTS

The NKN is a state-of-the-art Pan-India network. It will facilitate the development of India's information infrastructure, stimulate research, and create next generation applications and services. NKN is designed to provide high availability, Quality of Service, security and reliability

- Establishing a high-speed backbone connectivity which will enable knowledge and information sharing
- Enabling collaborative research, development and Innovation
- Facilitating advanced distance education in specialized fields such as engineering, science, medicine etc.
- Facilitating an ultra high speed backbone for e-Governance
- Facilitating integration of different sectoral networks in the field of research, education, health, commerce and governance.

CONNECTIVITY

The backbone of the network starts from 2.5 Gbps and progressively moves onto 10 Gbps connectivity between 7 Supercore (fully meshed) locations pan India. The network is further spread out through 26 Core locations with multiple of 2.5/10 Gbps partially meshed connectivity with Supercore locations. The distribution layer connects entire country to the core of the network using multiple links at speeds of 2.5/10 Gbps. The end users are being connected upto a speed of 1 Gbps.

The network architecture and governance structure allows users with options to connect to the distribution layer as well. NKN enables creation of Virtual Private Networks (VPN) as well for special interest groups.

NKN provides international connectivity to its users for global collaborative research. Presently, NKN is connected to Trans Eurasia Information Network (TEIN3). Similar connectivity to GLORIAD network is in the pipeline.

APPLICATIONS

Countrywide Virtual Classroom

The NKN is a platform for delivering effective distance education where teachers and students can interact in real time. This is especially significant in a country like India where access to education is limited by factors such as geography, lack of infrastructure facilities etc. The network enables co-sharing of information such as classroom lectures, presentations and handouts among different institutions.

Collaborative Research

The NKN enables collaboration among researchers from different entities like GLORIAD, TEIN3, GARUDA, CERN etc. NKN also enables sharing of scientific databases and remote access to advanced research facilities.

Virtual Library

The Virtual Library involving sharing of journals, books and research papers across different institutions, is a natural application for NKN.

Sharing of Computing Resources

High-performance computing is critical for national security, industrial productivity, and advances in science and engineering. The network enables a large number of institutions to access high-performance computing to conduct advanced research in areas such as weather monitoring, earthquake engineering and other computationally intensive fields.

Grid Computing

The NKN has the capability to handle high bandwidth with low latency and provision to overlay grid computing. Some of the grid based applications are climate change/global warming, science projects like Large Hadron Collider (LHC) and ITER. The NKN can be the platform to realize many such innovative applications. The Garuda Grid has enhanced its power and stability by migrating to NKN.

Network Technology Test-bed

NKN provides test-bed for testing and validation of services before they are made available to the production network. NKN also provides an opportunity to test new hardware & software, vendor interoperability etc.

e-Governance

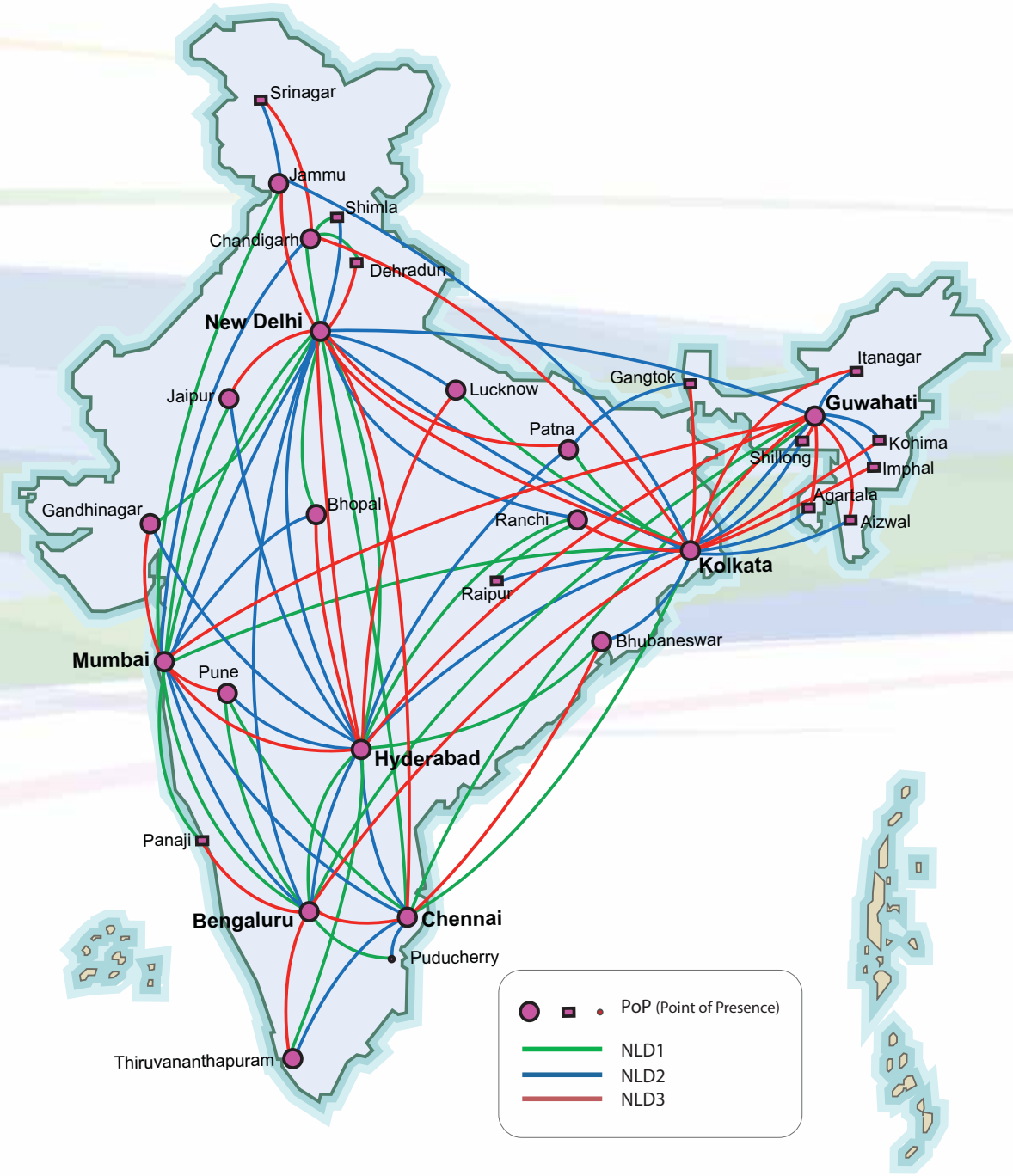
NKN acts as a super highway for integrating e-Governance infrastructure such as government data centres and networks. NKN provides bulk data transfer facility required for e-Governance applications.

NKN Services

Generic Services: Internet, Intranet, Network Management Views, e-Mail, Messaging Gateways, Caching Gateways, Domain Name System, Web Hosting, Voice over IP, Multipoint Control Unit (MCU) Services, Video Portals, SMS Gateway, Co-Location Services, Video Streaming etc.

Community Services: Shared Storage, e-Mail List Software Application (LISTSERV), Authentication Service, EVO, Session Initiation Protocol (SIP), Collaboration Service, Content Delivery Service, International Collaborations with EU-India Grid, Global Ring Network for Advanced Applications Development (GLORIAD) etc.

Special Services: Virtual Private Network Stitching Services [VPN@L2 (Virtual Private Wire Service / Virtual Private LAN Service), VPN@L3] etc.



Multiple 2.5/10 G Connecting all the State Capitals & Gigabit Connectivity to all the Districts

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